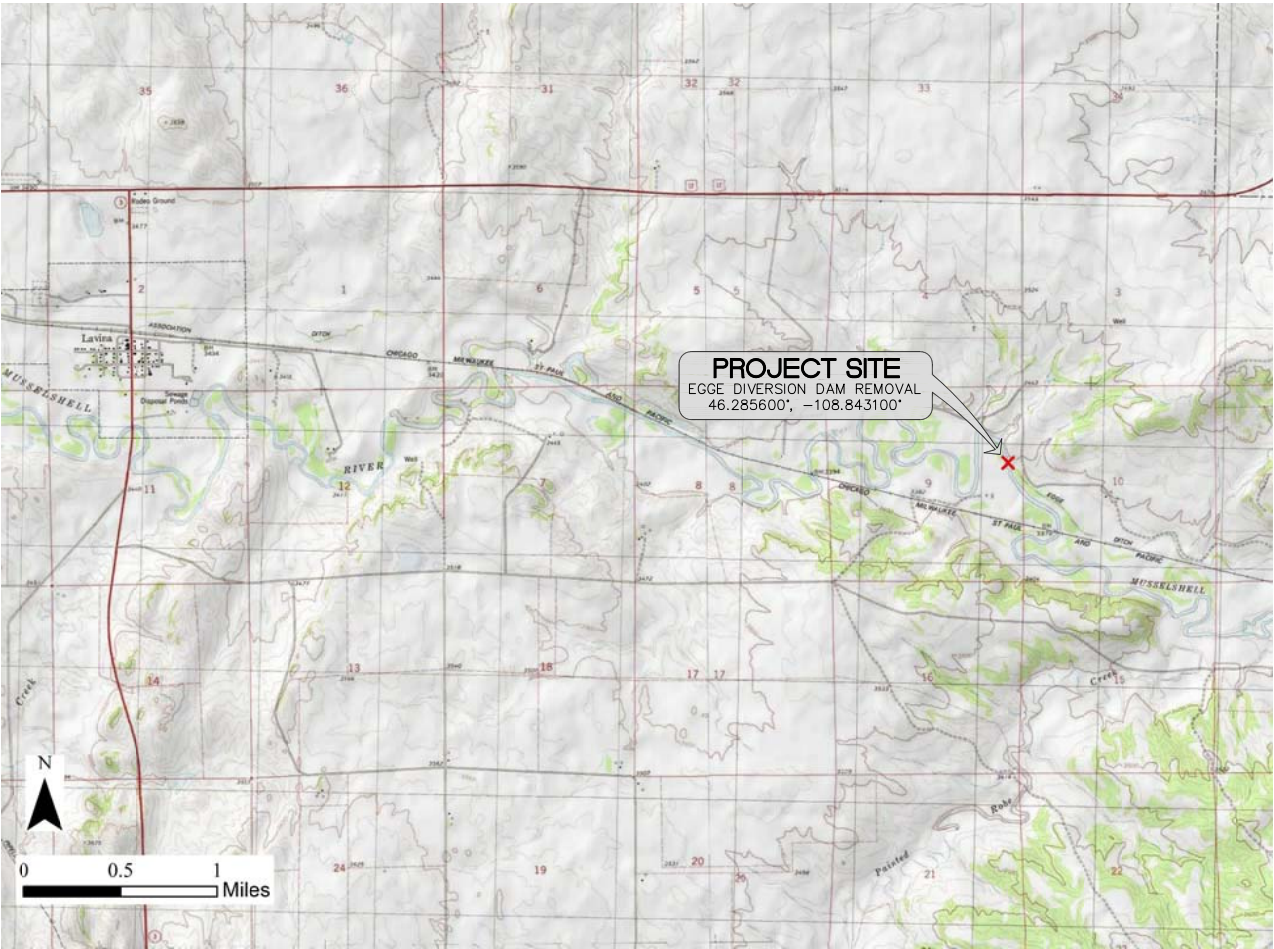
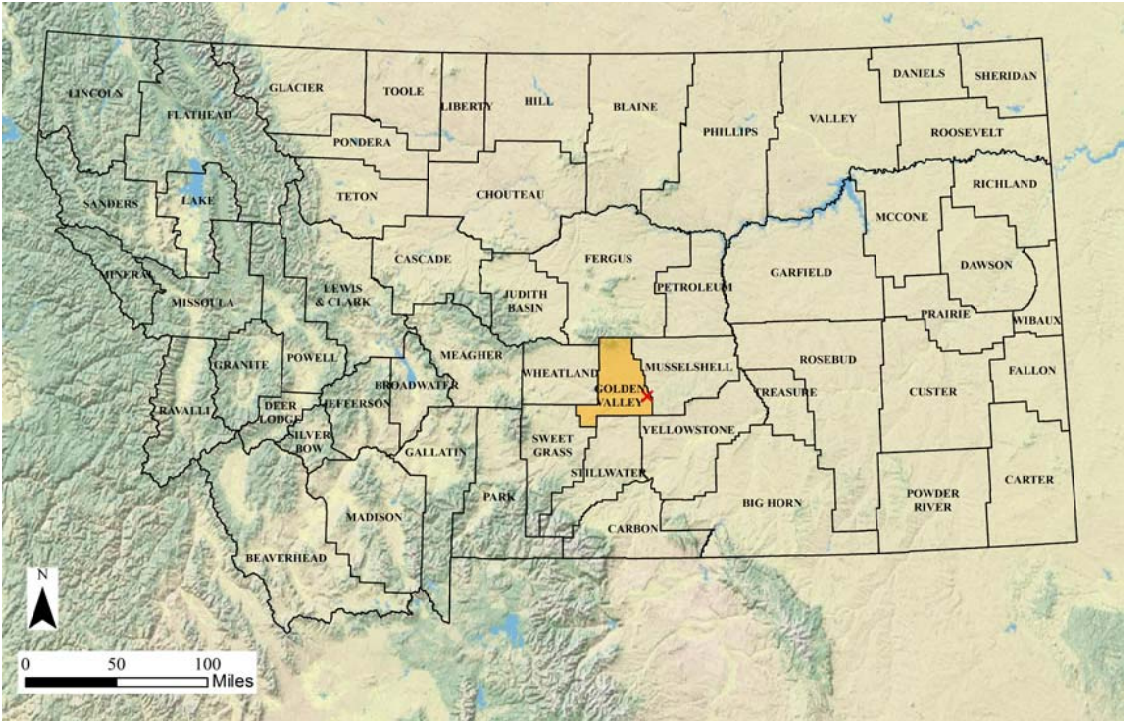


# EGGE DIVERSION DAM REMOVAL, FWP #16-15

## Dam Removal and Site Reclamation on the Musselshell River

LOCATED IN SECTION 9, TOWNSHIP 6N, RANGE 23E  
IN GOLDEN VALLEY COUNTY, MONTANA  
LATITUDE = 46.285600, LONGITUDE = -108.843100  
PROJECT SPONSOR: MONTANA DEPARTMENT OF FISH WILDLIFE AND PARKS

FEBRUARY 23, 2016 SET NO. \_\_\_\_\_



VICINITY MAP  
SHEET INDEX

SHEET NO.	DESCRIPTION
1	COVER
2	SURVEY CONTROL AND EXISTING CONDITIONS
3	PROJECT OVERVIEW
4	DESIGN PLAN
5	DETAILS
6	DETAILS
7	CROSS-SECTIONS
8	CROSS-SECTIONS
9	BEST MANAGEMENT PRACTICES PLAN
10	CONTROL OF WATER OVERVIEW

32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (406) 582-0221  
FAX (406) 582-5770  
www.alliedengineering.com

Civil Engineering  
Geotechnical Engineering  
Land Surveying



PROJECT MANAGER: PAUL SANFORD, PE  
DESIGN ENGINEER: JENNIFER JOHNSON, EI

CONSTRUCTION PLANS



CONTROL TABLE				
Point #	Elevation	Northing	Easting	Description
1	3380.60	742859.20	2134305.10	BASE
2	3379.76	742966.72	2134411.36	AC CP2
3	3379.11	742819.41	2134666.86	AC CP3

ALIGNMENT COORDINATE TABLE				
Line #	Length	Direction	Start Point	End Point
L19	189.49	N20° 05' 42.64"W	(2134686.28,742454.29)	(2134621.18,742632.24)
L20	140.81	N24° 35' 24.41"W	(2134621.18,742632.24)	(2134562.59,742760.28)
L21	178.12	N22° 11' 25.06"W	(2134562.59,742760.28)	(2134495.31,742925.21)
L22	163.38	N16° 59' 27.03"W	(2134495.31,742925.21)	(2134447.57,743081.46)
L23	215.28	N14° 35' 47.49"W	(2134447.57,743081.46)	(2134393.32,743289.79)



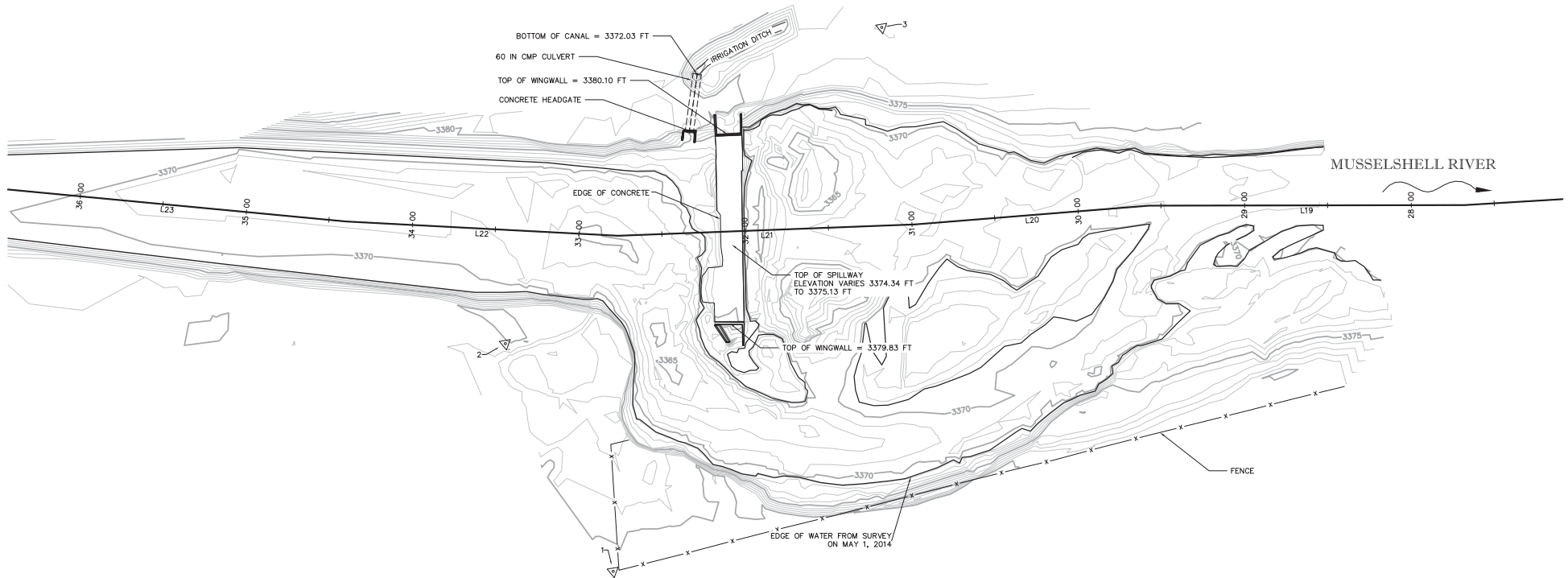
**NOTES:**

1. A SITE RECONNAISSANCE WAS PERFORMED BY PAUL SANFORD, PE AND JENNIFER JOHNSON, EI OF ALLIED ENGINEERING SERVICES, INC. ON MAY 1, 2014.
2. TOPOGRAPHIC SURVEY PERFORMED BY KYLE THOMPSON, LS OF ALLIED ENGINEERING SERVICES, INC. ON MAY 1, 2014.
3. BEARINGS SHOWN ARE MONTANA STATE PLANE GRID. DISTANCES ARE GRID DISTANCES IN INTERNATIONAL FEET.

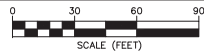
HORIZONTAL DATUM: MONTANA STATE PLANE NAD 83  
UNITS: INTERNATIONAL FEET

VERTICAL DATUM: NAVD 88, UNITS: U.S. SURVEY FEET

4. THE RIVER BYPASSED THE DAM DURING THE FLOODING OF 2011.
5. SCOUR AND DEPOSITION IN RIVER CHANNELS CAN CAUSE SIGNIFICANT CHANGES IN RIVERBED TOPOGRAPHY. THIS SITE WAS SURVEYED ON MAY 1, 2014 BEFORE SPRING RUNOFF. CONTOURS AND BANK LOCATIONS SHOWN ON THIS SHEET MAY NOT MATCH EXISTING CONDITIONS AT TIME OF CONSTRUCTION.



NO.	REVISIONS	DRAWN BY	DATE



PROJECT ENGINEER: PJS  
DESIGNED BY: JMW  
DRAWN BY: JMW  
REVIEWED BY: PJS

**EGGE DIVERSION DAM REMOVAL  
SURVEY CONTROL AND EXISTING CONDITIONS**  
GOLDEN VALLEY COUNTY, MT

32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (408) 582-0221  
FAX (408) 582-5170  
www.alliedengineering.com

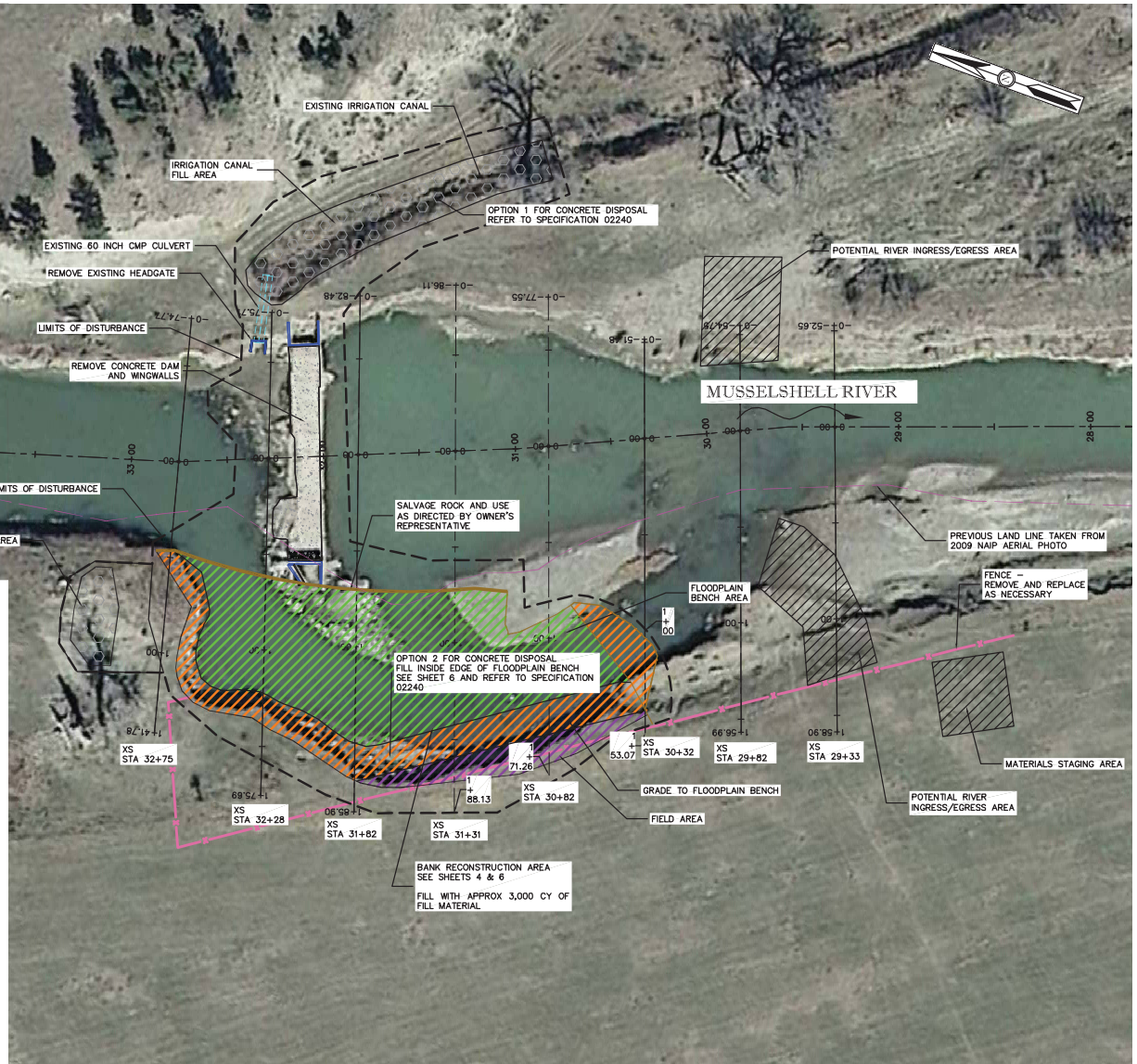
**Civil Engineering  
Geotechnical Engineering  
Land Surveying**



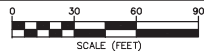
PROJECT # 14-043	SHEET
DATE: 7/11/14	2
EXISTING CONDITIONS	
EGGE DIVERSION	
EXISTING CONDITIONS	

P:\2014\14-043 Musselshell River - Egge Diversion\13 CAD-Production\user\Survey Control and Existing Conditions.dwg

No.	Materials and Activity	Quantity	Unit
1.0	<b>Site Preparation</b>		
1.1	Mobilization/Demobilization	1	Lump
1.2	Control of Water	1	Lump
1.3	Site Access and Staging Areas Reclamation	1	Lump
1.4	Construct and Reclaim River Ingress/Egress Areas	2	Each
1.5	Remove & Replace Fence	300	LF
2.0	<b>Site Improvements</b>		
2.1	Demolition: Remove Concrete Dam	500	CY
2.2	Demolition: Remove Headgate	1	Lump
2.3	Demolition: Fill Irrigation Ditch with Removed Concrete & Reclaim	1	Lump
2.4	Earthwork: Excavation in Riverbed	900	CY
2.5	Earthwork: Fill Scour Hole with On-Site Excavated Sand/Gravel Material	900	CY
2.6	Earthwork: Fill Scour Hole with Common Backfill	1,200	CY
2.7	Scour Hole Fill: Fill Scour Hole w/Imported Gravel Material (Rock Type 1)	500	CY
2.8	Scour Hole Fill: Fill Scour Hole w/Imported Pit-Run (Rock Type 2)	500	CY
2.9	Scour Hole Fill: Place Imported Topsoil on Field, Side Slopes, and in FES	450	CY
2.10	Bank Construction: Place Salvaged Rock	40	CY
2.11	Bank Construction: Place Imported Pit-Run (Rock Type 2)	400	CY
2.12	Bank Construction: Construct Fabric Encapsulated Soil (FES) - 2 Lifts	200	LF
2.13	Bank Construction: FES - Willow Pole	6,800	Each
2.14	Bank Construction: FES - Conifer Fodine	1,000	Each
2.15	Floodplain Treatment: Wood Material in Trenches	10	Each
2.16	Floodplain Treatment: Willows for Wood Material in Trenches	500	Each
2.17	Site Restoration: Seed Disturbed Areas	4,200	SY
2.18	Erosion Control: Erosion Control Fabric	1,000	SY
2.19	Erosion Control: Straw Wattle	400	LF



NO.	REVISIONS	DRAWN BY	DATE



PROJECT ENGINEER: PJS  
DESIGNED BY: JMW  
DRAWN BY: JMW  
REVIEWED BY: PJS

## EGGE DIVERSION DAM REMOVAL PROJECT OVERVIEW GOLDEN VALLEY COUNTY, MT

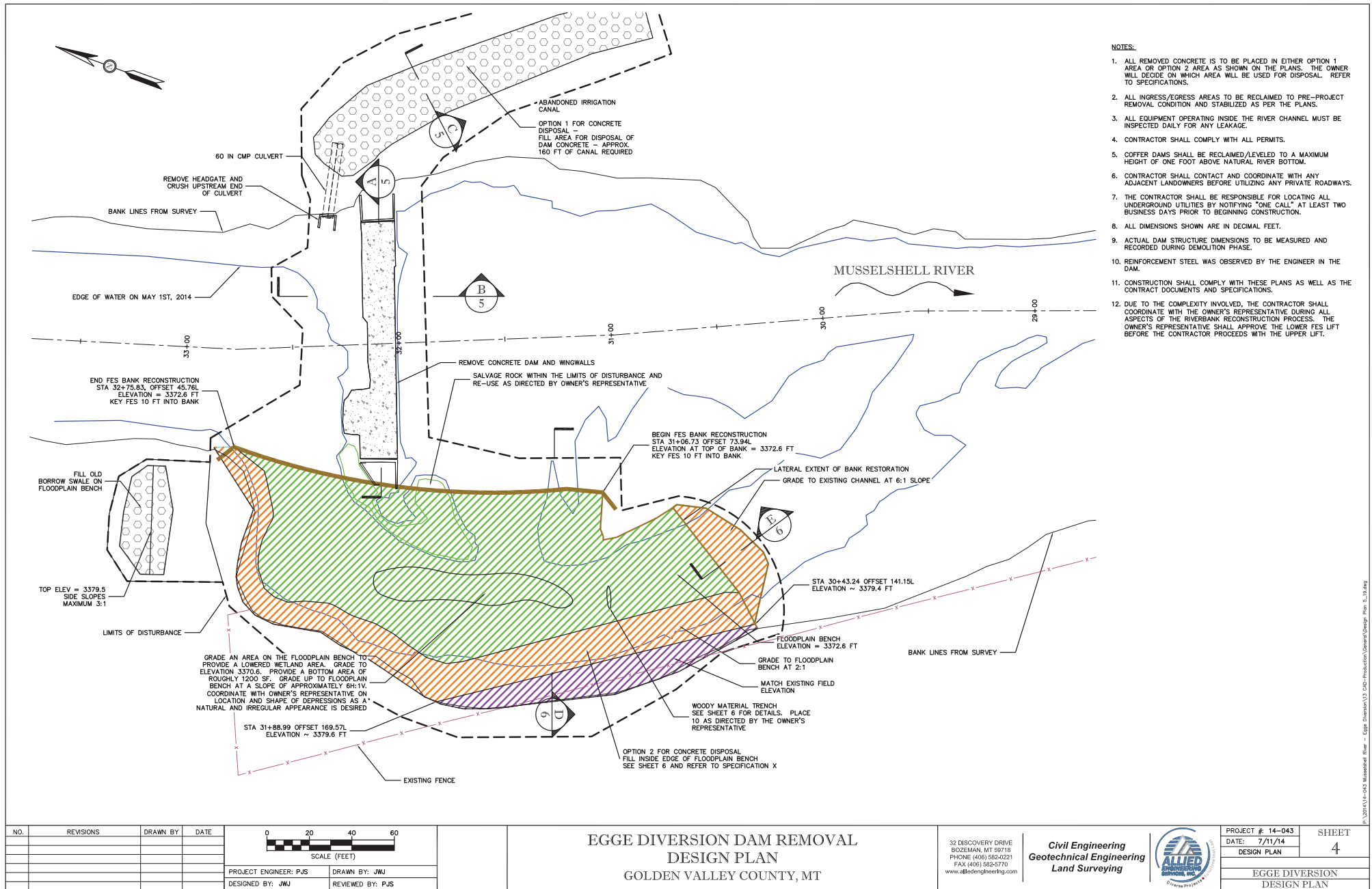
32 DISCOVERY DRIVE  
BOZEMAN, MT 59716  
PHONE (406) 582-0221  
FAX (406) 582-5770  
www.alliedengineering.com

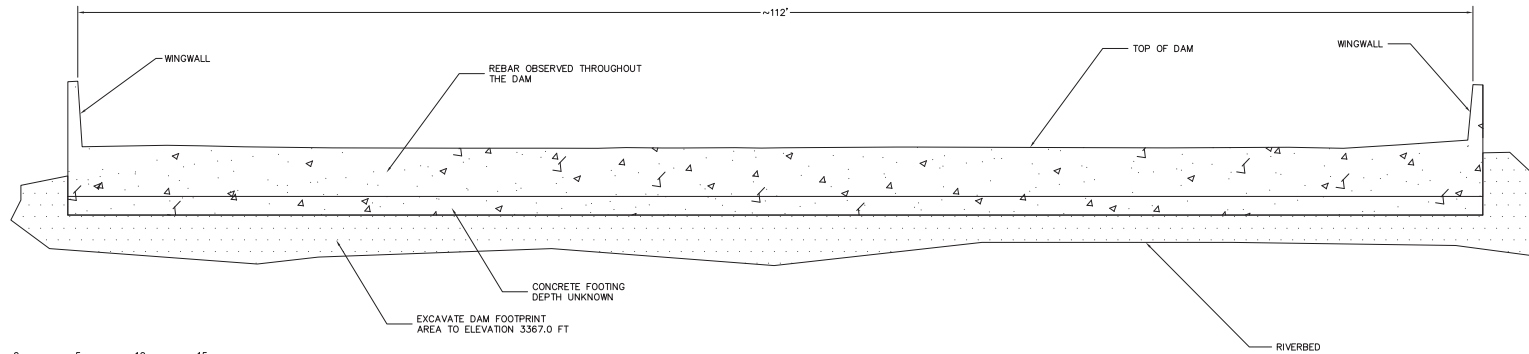
Civil Engineering  
Geotechnical Engineering  
Land Surveying



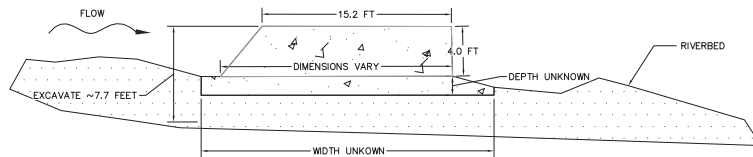
PROJECT # 14-043	SHEET
DATE: 7/11/14	3
PROJECT OVERVIEW	
EGGE DIVERSION	
PROJECT OVERVIEW	



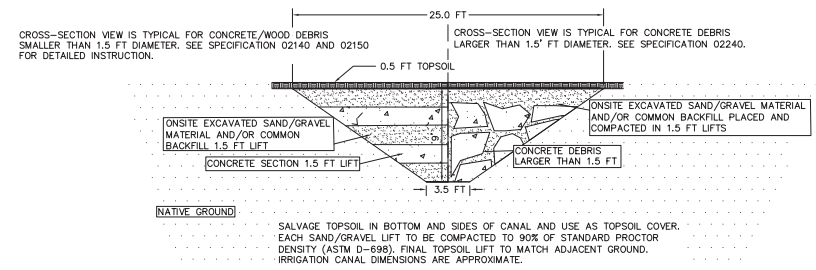




**A**  
4 SECTION  
DAM CROSS-SECTION




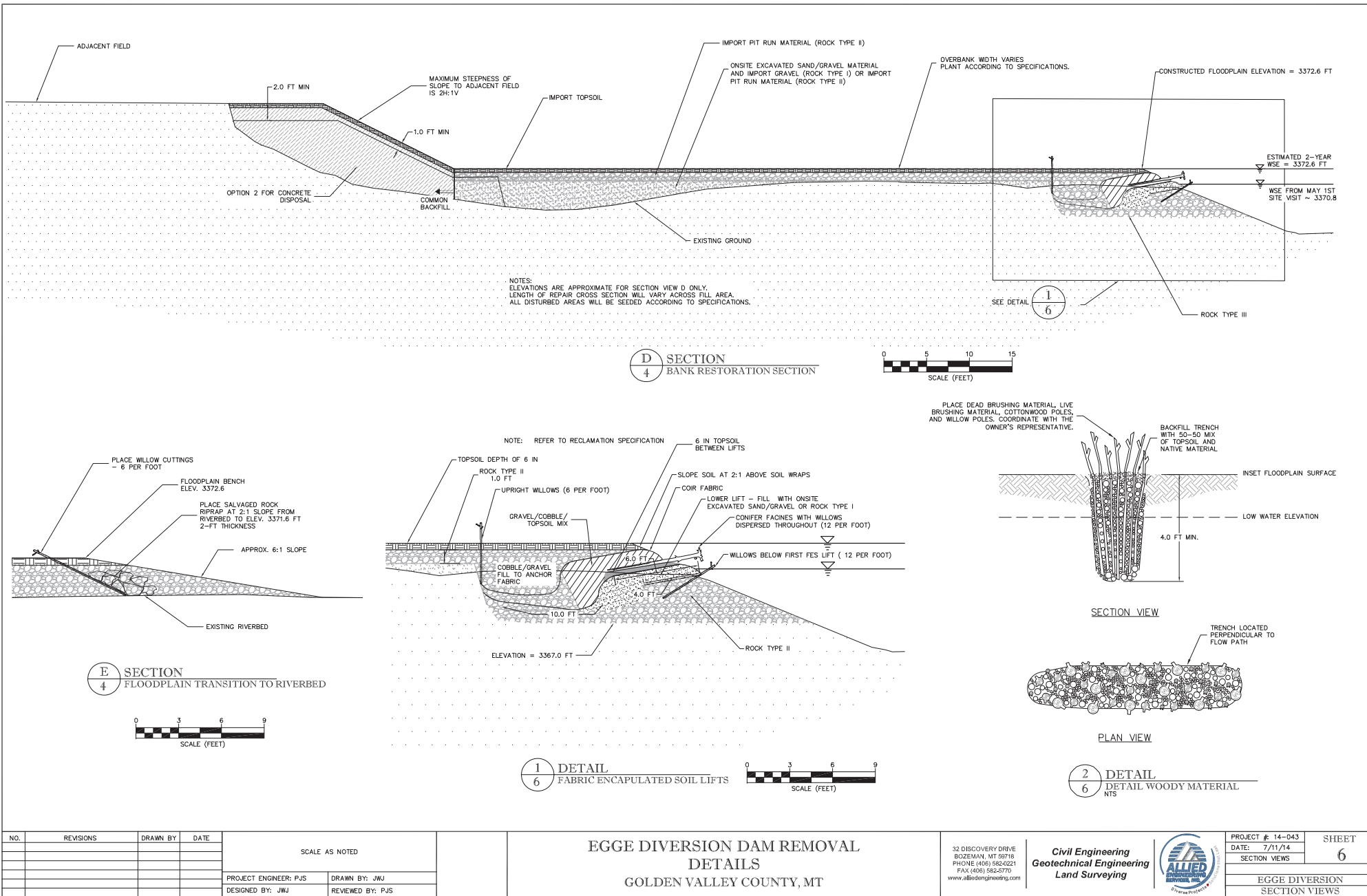
**B**  
4 SECTION  
HEADWALL CROSS-SECTION



**C**  
4 SECTION  
IRRIGATION CANAL CROSS SECTION

NOTE:  
1. CONCRETE DIVERSION DAM DIMENSIONS SHOWN ARE APPROXIMATE. DIMENSIONS VARY ALONG LENGTH OF STRUCTURE.

NO.	REVISIONS	DRAWN BY	DATE	SCALE AS NOTED		EGGE DIVERSION DAM REMOVAL DETAILS GOLDEN VALLEY COUNTY, MT		32 DISCOVERY DRIVE BOZEMAN, MT 59718 PHONE (406) 582-0221 FAX (406) 582-5770 www.alliedengineering.com		Civil Engineering Geotechnical Engineering Land Surveying			PROJECT # 14-043	SHEET	
														DATE: 7/11/14	5
														SECTION VIEWS	
				PROJECT ENGINEER: PJS	DRAWN BY: JWJ	EGGE DIVERSION DETAILS									
				DESIGNED BY: JWJ	REVIEWED BY: PJS										



NO.	REVISIONS	DRAWN BY	DATE

SCALE AS NOTED

PROJECT ENGINEER: PJS  
DESIGNED BY: JWW

DRAWN BY: JWW  
REVIEWED BY: PJS

# EGGE DIVERSION DAM REMOVAL DETAILS GOLDEN VALLEY COUNTY, MT

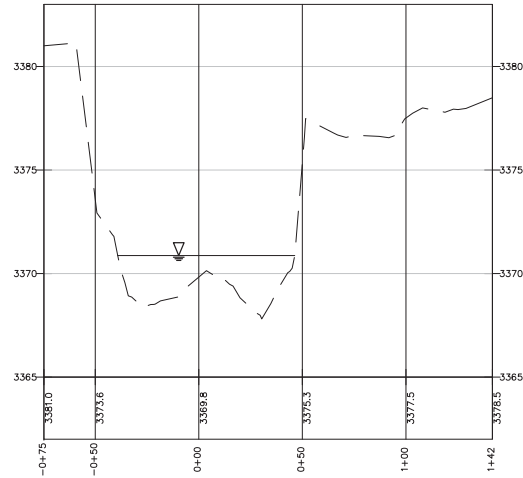
32 DISCOVERY DRIVE  
BOZEMAN, MT 59716  
PHONE (406) 582-0221  
FAX (406) 582-5170  
www.alliedengineering.com

Civil Engineering  
Geotechnical Engineering  
Land Surveying

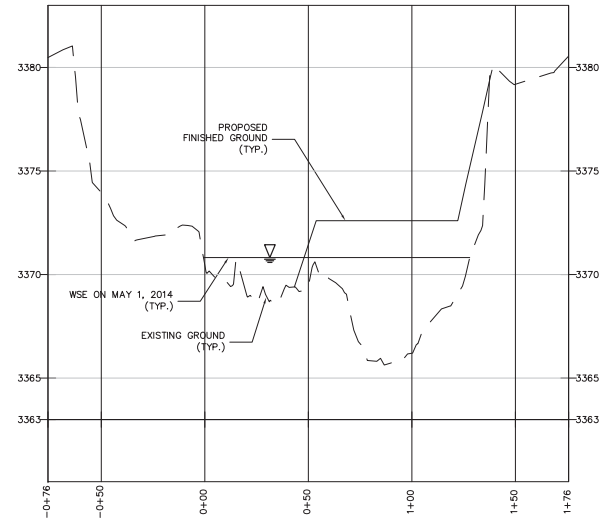


PROJECT # 14-043	SHEET
DATE: 7/11/14	6
SECTION VIEWS	
EGGE DIVERSION	
SECTION VIEWS	

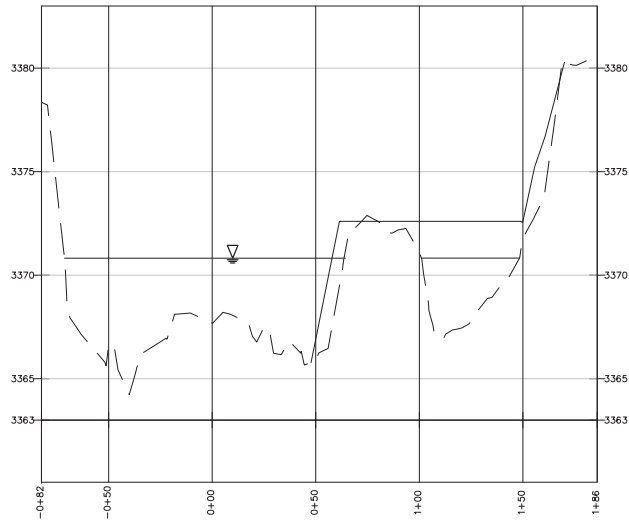
XS @ STA 32+75



XS @ STA 32+28

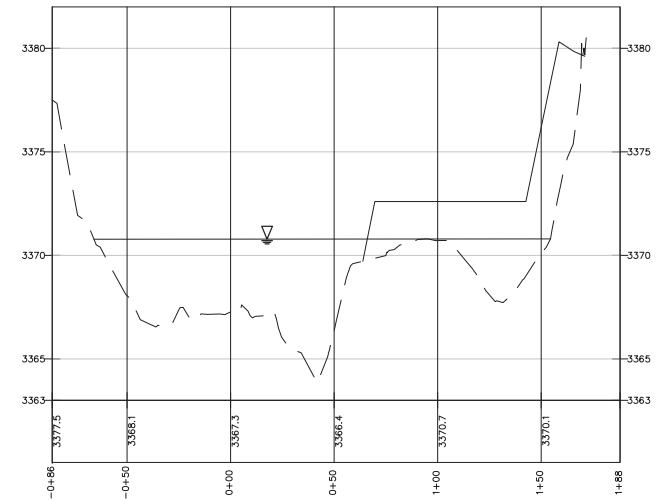


XS @ STA 31+82



NOTE:  
CROSS-SECTIONS VIEWED LOOKING  
DOWNSTREAM

XS @ STA 31+31



NO.	REVISIONS	DRAWN BY	DATE

HORIZONTAL SCALE: FEET 0 30 60	VERTICAL SCALE: FEET 0 3 6
PROJECT ENGINEER: PJS	DRAWN BY: JWJ
DESIGNED BY: JWJ	REVIEWED BY: PJS

EGGE DIVERSION DAM REMOVAL  
CROSS-SECTIONS  
GOLDEN VALLEY COUNTY, MT

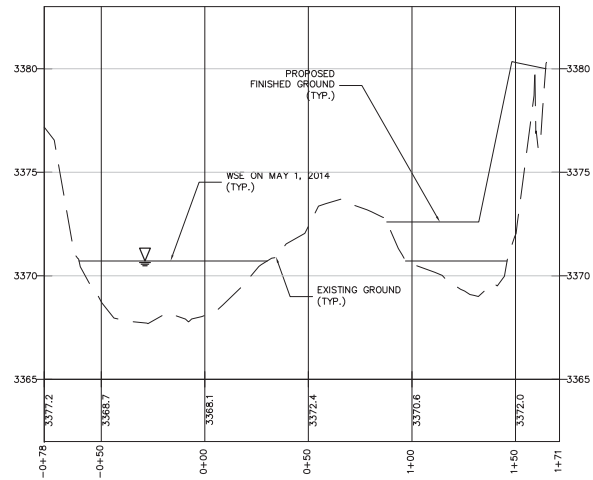
32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (408) 582-0221  
FAX (408) 582-5170  
www.alliedengineering.com

Civil Engineering  
Geotechnical Engineering  
Land Surveying

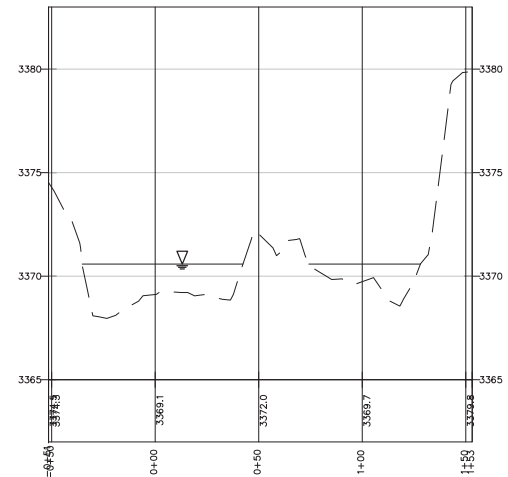


PROJECT # 14-043	SHEET
DATE: 7/11/14	7
CROSS-SECTIONS	
EGGE DIVERSION CROSS-SECTIONS	

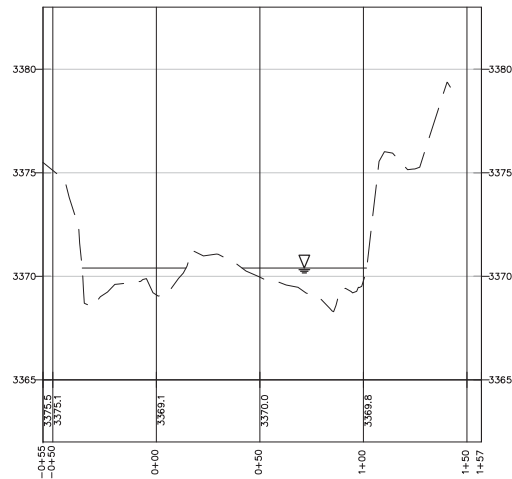
XS @ STA 30+82



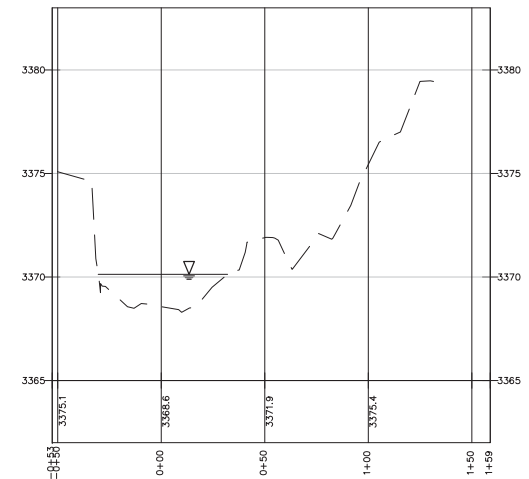
XS @ STA 30+32



XS @ STA 29+82



XS @ STA 29+33



NOTE:  
CROSS-SECTIONS VIEWED LOOKING  
DOWNSTREAM

NO.	REVISIONS	DRAWN BY	DATE

HORIZONTAL SCALE FEET 0 30 60	VERTICAL SCALE FEET 0 3 6
PROJECT ENGINEER: PJS	DRAWN BY: JWJ
DESIGNED BY: JWJ	REVIEWED BY: PJS

EGGE DIVERSION DAM REMOVAL  
CROSS-SECTIONS  
GOLDEN VALLEY COUNTY, MT

32 DISCOVERY DRIVE  
BOZEMAN, MT 59718  
PHONE (408) 582-0221  
FAX (408) 582-5170  
www.alliedengineering.com

Civil Engineering  
Geotechnical Engineering  
Land Surveying



PROJECT # 14-043	SHEET
DATE: 7/11/14	8
CROSS-SECTIONS	
EGGE DIVERSION	
PROJECT OVERVIEW	

P:\2014\14-043 Musselshell River - Egge Diversion\13 CAD-Production\Drawings\Cross Sections 1.dwg



